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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/826,354 | 04/19/2004 | Hiromi Otoma | 119498 | 1037 |
| 25944 | 7590 | 10/18/2005 | | |
| OLIFF & BERRIDGE, PLC P.O. BOX 19928 ALEXANDRIA, VA 22320 | | | EXAMINER TRAN, CHUC | |
| | | | ART UNIT 2821 | PAPER NUMBER |

DATE MAILED: 10/18/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/826,354

Applicant(s)

OTOMA, HIROMI

Examiner

Chuc D. Tran

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 April 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 April 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>7/29/04</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the “active region” in claims 1-2, 8-9, 15, 17 and 19-20 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

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A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

3. Claims 1-22 are rejected under 35 U.S.C. 102(e) as being anticipated by Takahashi et al (US 2005/0040413).

Regarding claims 1, 8 and 15-16, Takahashi et al disclose a surface emitting semiconductor laser in Fig. 109 comprising:

- a semiconductor substrate 4020;
- a first semiconductor multilayer reflection film (4079) of a first conduction type on the semiconductor substrate (Fig. 109);
- a second semiconductor multilayer reflection film (4078) of a second conduction type, wherein the second semiconductor multilayer film comprising AlaGa1-aAs , and composition ratios a , b and x meet $a > x > b$ (page 79, Col. b, Line 6 and 39);
- an active region (4023) and a current confining layer (33092) interposed between the first and second semiconductor multilayer reflection films (Fig. 109); and
- a low-resistance layer (4072) interposed between the current confining layer and the

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active region (Fig. 109).

Regarding claims 2 and 9, Takahashi et al disclose that the active region comprises an active layer and a spacer layer in which the active layer is provided (Fig. 109); and

- the low-resistance layer is provided between the current confining layer and the spacer layer (Fig. 109).

Regarding claims 3 and 10, Takahashi et al disclose that the low-resistance layer comprises $\text{Al}_x\text{Ga}_{1-x}\text{As}$ (page 79, Col. b, Line 6) ;

- the second semiconductor multilayer reflection film comprises $\text{Al}_a\text{Ga}_{1-a}\text{As}$ and $\text{Al}_b\text{Ga}_{1-b}\text{As}$ (page 79, Col. b, Line 6 and 39); and

- composition ratios a, b and x meet $a > x > b$ (page 79, Col. b, Line 6 and 39) .

Regarding claims 4 and 11, Takahashi et al disclose that the spacer layer comprises $\text{Al}_c\text{Ga}_{1-c}\text{As}$; and

- composition ratios a, b, c and x meet $a > x > b$ and $x > c$ (page 79, Col. b, Line 26, 39-50).

Regarding claims 5 and 12, Takahashi et al disclose that a product of d_1 and n_1 or a sum of a product d_1 and n_1 and a product of d_2 and n_2 is approximately equal to a quarter of λ where d_1 and n_1 respectively denote a thickness and a refractive index of the low-resistance layer, d_2 and n_2 respectively denote a thickness and a refractive index of the central conductive region of the current confining layer, and λ is a wavelength of laser light emitted (page 79, Col. b, Line 7 and 19).

Regarding claims 6 and 13, Takahashi et al disclose that the low-resistance layer has a

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carrier density higher than that of the second semiconductor multilayer reflection film (page 79, Col. b, Line 6 and 40).

Regarding claims 7 and 14, Takahashi et al disclose that the low resistance layer comprises a laminate of semiconductor layers (page 68, Col. a, Line 14).

Regarding claims 17 and 20, Takahashi et al disclose a method of fabricating a surface emitting semiconductor laser in Fig. 109 comprising the steps of:

- forming a semiconductor laminate on a semiconductor substrate, the semiconductor laminate including a first semiconductor multilayer reflection film of a first conduction type (Page 79, Col. b, Line 16), an active region (4074), a high-Al-composition-ratio semiconductor layer (4079) containing a high Al composition ratio (Page 79, Col. b, Line 39), low-resistance layer (4072) between which the high-Al-composition-ratio semiconductor layer is sandwiched, and a second semiconductor multilayer reflection film of a second conduction type (Abstract);

- etching the semiconductor laminate so that a mesa structure is formed on the semiconductor substrate (Page 13, Col. a, Line 61); and

- forming a current confining layer by oxidizing a part of the high-Al-composition-ratio layer from a side surface of the mesa structure to form the current confining layer (Page 79, Col. b, Line 56).

Regarding claims 18 and 21, Takahashi et al disclose that the low-resistance layer (4072) comprises $\text{Al}_x\text{Ga}_{1-x}\text{As}$ (Page 79, Col. b, Line 39);

- the second semiconductor multilayer reflection film (comprises $\text{Al}_a\text{Ga}_{1-a}\text{As}$ and $\text{Al}_b\text{Ga}_{1-b}\text{As}$ (Page 79, Col. b, Line 6); and

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- composition ratios a , b and x meet $a > x > b$ (Page 79, Col. b, Line 39).

Regarding claims 19 and 22, Takahashi et al disclose that the active region (4074) comprises spacer layers between which an active layer is sandwiched (Fig. 109);

- the spacer layers comprise AlGaIn-cAs (Fig. 109); and

- composition ratios a , b , c and x meet $a > x > b$ and $x > c$ (Page, 79, Col. b, Line 39).

Citation of relevant prior art

Prior art Takahashi et al (USP. 6,765,232) disclose semiconductor light emitting device.

Inquiry

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chuc D. Tran whose telephone number is (571) 272-1829. The examiner can normally be reached on M-F Flex hours.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Don Wong can be reached on (571) 272-1834. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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TC
October 15, 2005



**TUYET VO
PRIMARY EXAMINER**